

In the Claims:

Claim 1 (currently amended): A method for forming a field-effect transistor on a substrate, said substrate including a high-k dielectric layer situated over said substrate and a gate electrode layer situated over said high-k dielectric layer, said method comprising steps of:

etching said gate electrode layer and said high-k dielectric layer to form a gate stack, said gate stack comprising a high-k dielectric segment situated over said substrate and a gate electrode segment situated over said high-k dielectric segment;

performing a nitridation process on said gate stack, said nitridation process utilizing a nitrogen containing plasma to nitridate sidewalls of said gate stack, said nitridation process on said gate stack causing nitrogen to enter said high-k dielectric segment, said nitrogen forming an oxygen diffusion barrier in said high-k dielectric segment;

wherein said step of etching said gate electrode layer and said high-k dielectric layer to form said gate stack is performed in a plasma process chamber, said plasma process chamber being utilized to perform said step of performing said nitridation process on said gate stack.

Claims 2-5 (canceled)

Claim 6 (original): The method of claim 1 wherein said high-k dielectric segment is selected from the group consisting of hafnium oxide, hafnium silicate, zirconium oxide, zirconium silicate, and aluminum oxide.

Claim 7 (original): The method of claim 1 wherein said gate electrode segment comprises polysilicon.

Claim 8 (currently amended): A method for forming a field-effect transistor on a substrate, said substrate including a high-k dielectric layer situated over said substrate and a gate electrode layer situated over said high-k dielectric layer, said method comprising a step of etching said gate electrode layer and said high-k dielectric layer to form a gate stack, said gate stack comprising a high-k dielectric segment situated over said substrate and a gate electrode segment situated over said high-k dielectric segment, said method being characterized by:

selecting said high-k dielectric segment from the group consisting of hafnium oxide, hafnium silicate, zirconium oxide, zirconium silicate, and aluminum oxide;

performing a nitridation process on said gate stack;

said nitridation process utilizing a nitrogen containing plasma to nitride sidewalls of said gate stack, said nitridation process on said gate stack causing nitrogen to enter said high-k dielectric segment, said nitrogen forming an oxygen diffusion barrier in said high-k dielectric segment;

wherein said step of etching said gate electrode layer and said high-k dielectric layer to form said gate stack is performed in a plasma process chamber, said plasma process chamber being utilized to perform said step of performing said nitridation process on said gate stack.

Attorney Docket No.: 0180151

Claims 9-13 (canceled)

Claim 14 (original): The method of claim 8 wherein said gate electrode segment comprises polysilicon.

Claim 15 (currently amended): A method for forming a field-effect transistor on a substrate, said substrate including a high-k dielectric layer situated over said substrate and a gate electrode layer situated over said high-k dielectric layer, said method comprising steps of:

etching said gate electrode layer and said high-k dielectric layer to form a gate stack, said gate stack comprising a high-k dielectric segment situated over said substrate and a gate electrode segment situated over said high-k dielectric segment, said gate stack comprising sidewalls;

utilizing a nitrogen plasma to nitridate said sidewalls of said gate stack;

wherein said step of etching said gate electrode layer and said high-k dielectric layer to form said gate stack is performed in a plasma process chamber, said plasma process chamber being utilized to perform said step of performing said nitridation process on said gate stack;

forming source/drain regions adjacent to said gate stack;

fabricating spacers on said sidewalls of said gate stack;

performing a rapid thermal anneal on said gate stack.

Attorney Docket No.: 0180151

Claim 16 (original): The method of claim 15 wherein said step of utilizing said nitrogen plasma to nitridate said sidewalls of said gate stack causes nitrogen to enter said high-k dielectric segment, said nitrogen forming an oxygen diffusion barrier in said high-k dielectric segment.

Claims 17-18 (canceled)

Claim 19 (original): The method of claim 15 wherein said high-k dielectric segment is selected from the group consisting of hafnium oxide, hafnium silicate, zirconium oxide, zirconium silicate, and aluminum oxide.

Claim 20 (original): The method of claim 15 wherein said gate electrode segment comprises polysilicon.